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NOTE ON WESTERN RED ROT IN PINUS PONDEROSA

W. H. LONG

In the National Forests of Arizona and New Mexico, a varying percentage of the trees of western yellow pine (*Pinus ponderosa*) is affected by a heart-rot, known locally as "red heart," "red rot," "gray rot," "top rot," and "heart rot." The amount of this rot present varies materially with the exposure, slope, and soil on which the yellow pine is growing, as well as with the age of the timber itself.

This heart-rot is called in this paper "western red rot" in order to distinguish it from the true "red heart" or "red rot," a very similar heart-rot common in many species of conifers. True "red rot" or "ring scale" is caused by *Trametes pini*, while "western red rot" is produced by an entirely different fungus.

Western red rot has three stages in its development: (1) An initial stage in which the affected heartwood is firm but shows reddish to dark brown discolored areas; (2) an intermediate stage in which the diseased heartwood is whitish or gray in color and is more or less delignified; and (3) a final stage in which much of the heartwood has disappeared due to the absorption of the delignified portions, while the wood particles left are brittle and easily crumble when handled.

The fungus which causes "western red rot" never forms brown, woody, perennial fruiting bodies on the boles of living affected pine trees as *Trametes pini* does, but forms annual fruiting bodies which usually develop as white encrusting layers on the underside of logs. However, fruiting bodies have been found which have distinct and well-formed pilei. The pileate form of the fungus resembles very closely *Polyporus Ellisianus* (*Tyromyces Ellisianus* of Murrill in North American Flora) and is probably this species.

Western red rot is exceedingly common throughout the western yellow pine regions of Arizona and New Mexico. Specimens of the fungus have also been examined from Vermont, New Jersey, Washington, and Idaho, while a photograph of the rot in western yellow pine has been seen from South Dakota. It is therefore highly probable that the fungus is widely distributed throughout the western states and to a limited extent at least in the northeast.

The western red rot fungus enters the living tree through the heartwood of dead branches in the crown. It first attacks the sapwood of the dead branch, then the heartwood; it then travels down the dead branch into the heartwood of the living tree.

In order to throw some light on the presence of western red rot in western yellow pine and its probable influence on the rotation period, studies were conducted on certain areas in the Santa Fe National Forest, N. Mex., where both tie trees and sawtimber were being cut. These areas were especially suitable for a study of this character, since an unusually large percentage of the black jack (30 to 50 per cent.) and nearly all of the yellow pine (85 to 100 per cent.) were being cut. A marked difference was found in the percentage of black jack (young western yellow pine before it reaches the age of 125 to 150 years) and of yellow pine affected by western red rot on these areas. Of 1815 felled merchantable black jacks examined, only 29 or 1.59 per cent. had this rot, while out of 563 yellow pines, 77 or 13.6 per cent. were attacked by it. The above data show that during the black jack period, the trees are practically free from western red rot but as they grow older, the increasing number of dead branches make them more subject to the attacks of the fungus.

On the areas examined, western yellow pine trees up to 125 to 150 years old were rarely attacked by western red rot, while trees over 200 years old showed a much higher percentage of rot than the younger trees (black jack). It therefore follows that a short rotation will be better for the future health of the forest as far as heart rots are concerned than a long one. It is a fundamental fact that the older a tree is, the more liable it is to be attacked by heart-rotting fungi.

It was also found that western yellow pine trees growing on very thin soil, on steep south or east slopes where growth conditions are poor have a higher percentage of western red rot than trees situated where the growth conditions are good.

OFFICE OF INVESTIGATIONS IN FOREST PATHOLOGY,
BUREAU OF PLANT INDUSTRY,
ALBUQUERQUE, N. MEX.